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PATENT SPECIFICATION

DRAWINGS ATTACHED

1046.901

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COMPLETE SPECIFICATION

Improvements relating to Suction Cleaners

We, ASSOCIATED ELECTRICAL INDUSTRIES LIMITED a British Company having its registered office at 33, Grosvenor Place, London, S.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to suction cleaner nozzle assemblies with particular but non-exclusive application to such assemblies as can be embodied in cleaning tools of the manually held kind which in use are connected to a suction unit through a flexible hose, usually with a rigid tube between this hose and the tool to act as a handle.

Nozzle assemblies are known in which the suction nozzle is combined with a brush mounted behind the nozzle (considering the forward direction of movement of the assembly when in use) or with brushes mounted both behind and in front of the nozzle, the brush or brushes being spring loaded so as to be urged into engagement with the surface being cleaned. With a brush behind the nozzle only, the action and cleaning efficiency of the assembly is necessarily different in the forward and reverse directions of movement over the surface being cleaned, while with brushes urged into engagement with this surface both in front of and behind the nozzle there will be correspondingly greater friction forces increasing the effort required to move the assembly over the surface. Moreover in the latter case the brush which is leading during an operating stroke in either direction will tend to sweep dirt in front of it, away from the nozzle. Wheeled nozzle and brush assemblies are also known, and likewise assemblies which can be adjusted by the user, for instance to render the brushes more or less active, according to the nature (for example piled or smooth) of the surface to be cleaned.

It is an object of the present invention to provide an improved form of nozzle and

brush assembly which will be suitable for cleaning different types of surface without requiring adjustment and which will have similar cleaning efficiencies in both forward and reverse directions of movement over such surface.

According to the invention in a suction cleaner nozzle assembly having wheels for maintaining the nozzle clear of a smooth surface being cleaned while permitting it to penetrate a pile surface, brushes provided behind and in front of the nozzle in relation to cleaning movement of the assembly over a surface are mounted for displacement respectively towards and away from said surface by the action of means sensitive to the direction of such movement and acting so as to tend to lift away from the surface the or each brush which for the time being is leading the nozzle while tending to urge the or each brush which is following the nozzle towards the surface. To achieve the direction-sensitive action the brushes may be carried on pivotally mounted or resilient arms so arranged that reaction forces between the brushes and the surface being cleaned tend to cause the arm or arms carrying each leading brush to pivot or flex away from the surface and the arm or arms carrying each following brush to pivot or flex towards the surface.

The invention may be more fully understood by reference to the drawing filed with the Provisional Specification and to the accompanying drawing, of which the former illustrates somewhat schematically, in a cross-sectional view taken in a central plane parallel to the to-and-fro cleaning movement, a suction cleaner nozzle assembly embodying the invention and designed as a cleaning tool for a cylinder or canister type suction cleaner. The accompanying drawing shows an under-plan and two cross-sectional views of another embodiment incorporating various modifications.

In the Provisional drawing, the nozzle 1 of the assembly is formed by an open compart-

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ment 2 having an outlet duct 3 which in use will be connected through a flexible hose (not shown) to the suction unit. Wheels or rollers such as indicated at 4 are provided on opposite sides of the section plane in front of and behind the nozzle 1, these wheels being set so that with the tool resting on a smooth surface 5, the mouth of the nozzle will be spaced from it by a small fraction of an inch such that whereas the nozzle will in this way be maintained clear of a linoleum or other smooth surface on which the tool is being used, it will penetrate the pile of a carpet or rug. Also in front of and behind the nozzle 1 (considering the forward direction D of the movement of the tool in use) are respective strip brushes 6 and 7 carried by respective arms 8 and 9 pivoted at 10 and 11 on the main body 12 of the tool, the pivot 10 being in advance of the brush 6 and the pivot 11 being equally to the rear of the brush 7. To maintain the brushes normally in contact with the surface being cleaned they may be lightly spring-loaded (not here shown). Their downward movement is limited by suitable stops (also not shown) in order to prevent jamming during operation. The arrangement will to some extent be self adjusting to compensate for brush wear, but if desired facility for further adjustment may be provided, for instance by having the position of the pivots 10 and 11 adjustable by means of a cam mechanism.

When the tool is used, movement over the surface being cleaned in the forward direction D will give rise to reaction forces F1 on the then leading brush 6 and F2 on the following brush 7. The reaction force F1 will tend to lift the brush 6 and its arm 8 about the pivot 10 as indicated by the arrow R, while by the action of the force F2 the brush 7 will be urged into firmer engagement with the surface being cleaned (as indicated by arrow L) by reason of its arm 9 tending to be driven downwardly about the pivot 11. On reversal of the direction of movement of the tool, the leading and following roles of the brushes 6 and 7 and the direction of the forces F1 and F2 are reversed, with the result that, again, the leading brush (now 7) tends to be lifted away from the surface and the following brush (6) to be urged into firmer engagement with it. When the tool is used on carpets removal of dust and grit is achieved by the suction through the nozzle and the following brush (whichever it may be) acts to displace thread and fluff and to restore the pile disturbed by the nozzle. On linoleum and hard floors the leading brush tends to ride over dirt and grit, enabling the following brush to sweep it forward into the suction air flow through the nozzle.

In the accompanying drawings Fig. 1 is an under-plan view of a cleaning tool suction nozzle assembly somewhat similar to that

already described but incorporating various modifications. Figs. 2 and 3 are cross-sectional side views taken along lines II—II and III—III respectively. The main body 12¹ of the tool, moulded or cast from any suitable material and swivel-jointed at 13 to a coupling member 14, has secured over on its underside a shaped plate 15 which has slots for the nozzle 1, for the brushes 6 and 7 and for the wheels 4. The front wheels 4(F) are wider than the rear wheels 4(R) so as partially to resist the tendency for the forward end of the tool to press into the pile of a carpet when the assembly is being pushed in a forward direction over it. The plate 15, and in particular its downwardly inclined portions 15¹ which act as fairing surfaces, assist in preventing the protruding parts of the nozzle from unduly restricting to-and-fro movement of the tool over a pile carpet. The plate 15 has been shown partly broken away in Fig. 1 in order to reveal parts which would otherwise be obscured in this Figure. Each of the brushes 6 and 7 is carried by two pivotally mounted arms 16, one at each end, and is lightly spring-loaded in a downward direction by a shaped leaf spring 17. Each of the arms 16 pivotally engages in a slot 18 in the main body 12¹ and downward movement of the brushes 6 and 7 relative to the main body is limited by engagement of the arms 16 with the inside of the plate 15: this can be seen at 19 in Fig. 3. The leaf springs 17 are also located by engagement in slots 20 in the main body 12¹. (It will be appreciated that instead of the arms 16 and a separate leading spring 17, each brush could be carried by arms which are themselves resilient and are mounted at opposite ends of the brushes in a manner similar to the springs 17.) The basic action of the tool and in particular of the brushes 6 and 7 is the same as already described in relation to Fig. 1.

WHAT WE CLAIM IS:—

1. A suction cleaner nozzle assembly having wheels for maintaining the nozzle clear of a smooth surface being cleaned while permitting it to penetrate a pile surface, wherein brushes provided behind and in front of the nozzle in relation to cleaning movement of the assembly over a surface are mounted for displacement respectively towards and away from said surface by the action of means sensitive to the direction of such movement and acting so as to tend to lift away from the surface the or each brush which for the time being is leading the nozzle while tending to urge the or each brush which is following the nozzle towards the surface.

2. A nozzle assembly as claimed in claim 1 wherein said brushes are carried by pivotally mounted or resilient arms so arranged that reaction forces between the brushes and the surface being cleaned tend to cause the arm or arms carrying each leading brush to pivot

or flex away from the surface and the arm or arms carrying each following brush to pivot or flex towards the surface.

5 3. A nozzle assembly as claimed in claim 2 wherein the arms are of substantially equal effective lengths and extend from the brushes to positions further from the nozzle.

10 4. A nozzle assembly as claimed in any preceding claim including fairing surfaces to the front and rear of the nozzle, the brushes being between the nozzle and these fairing surfaces.

15 5. A nozzle assembly as claimed in any preceding claim having wheels in front of and behind the nozzle with the brushes between the wheels and the nozzle and with the for-

ward wheels (in the normal forward direction of cleaning movement of the assembly) wider than the rear wheels.

6. A suction cleaner nozzle assembly having a construction basically as hereinbefore described with reference to the drawing filed with the Provisional Specification. 20

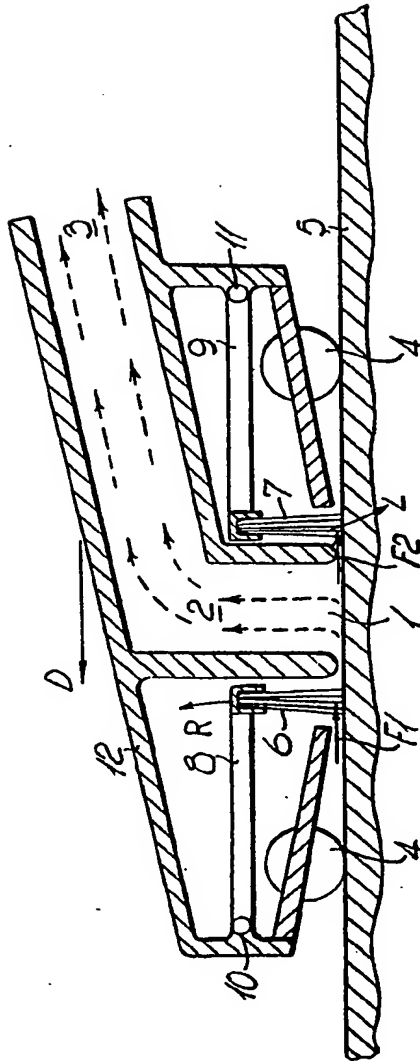
7. A suction cleaner nozzle assembly substantially as hereinbefore described with reference to the accompanying drawing. 25

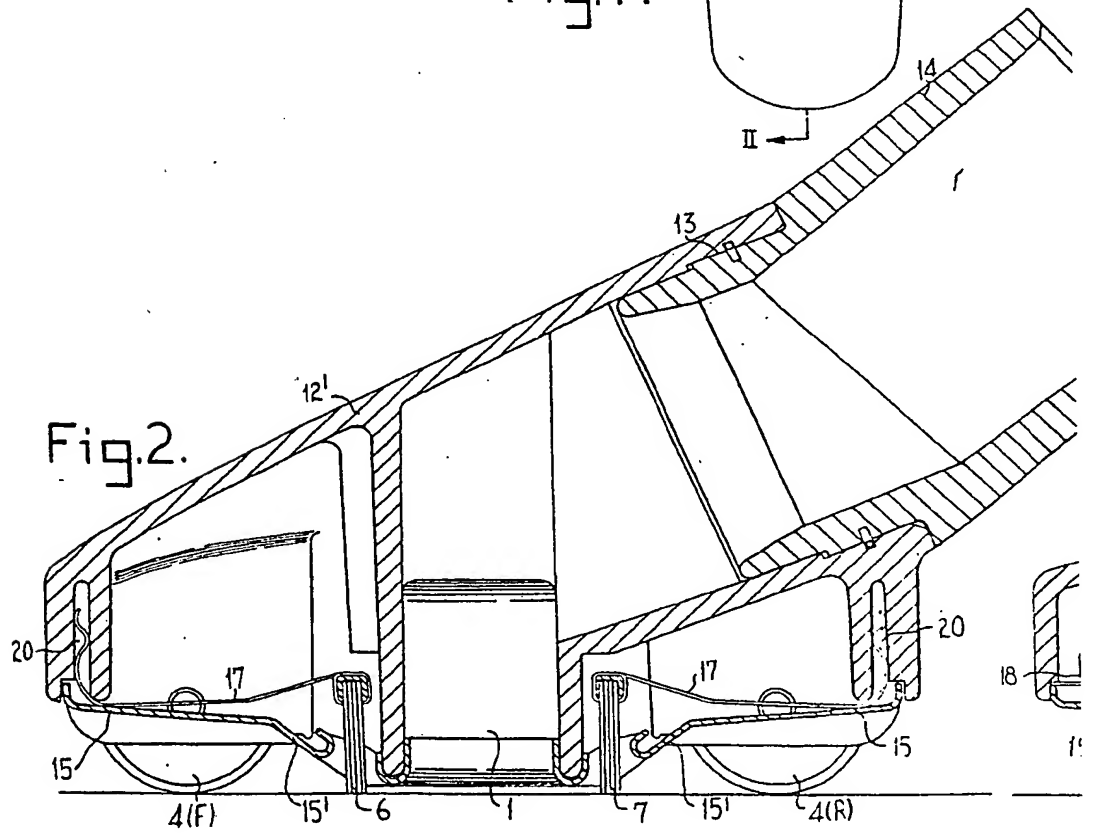
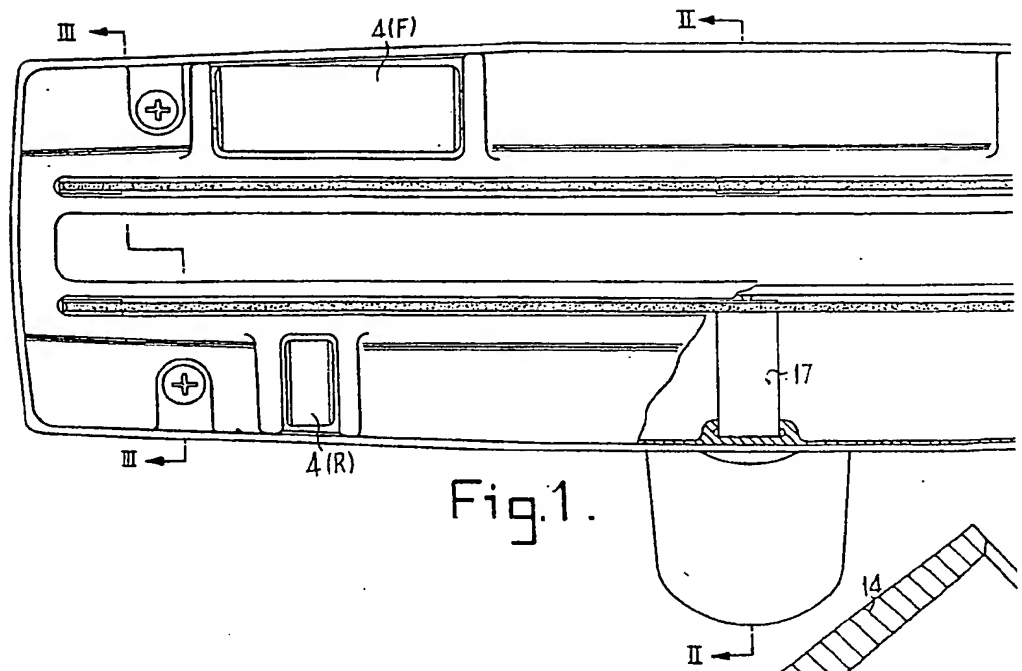
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PROVISIONAL SPECIFICATION
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the Original on a reduced scale





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